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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,431	02/22/2002	Wei Zhang	SUN-P6557	6363

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EXAMINER

HE, AMY

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 08/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/082,431

Applicant(s)

ZHANG, WEI

Examiner

Amy He

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on February 22, 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-3, 13-19 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto (U. S. Patent No. 5, 9000, 735).

Referring to claims 1, 14 and 16, Yamamoto discloses an apparatus/method for determining the critical length of a conductor (in Figures 2 and 8; column 6, line 59 - column 7, line 47) comprising:

testing means (pads 1) for providing a test signal (stress current) to at least one DUT (2), said at least one DUT including at least one test strip (2) of a metal under test, said at least one test strip formed from a series of segments of the metal (2, 3 and 4) under test;

means (external current source, column 6, lines 59-60) for providing a test signal to said testing means (1);

~~means (external resistance measurement equipment, column 11, lines 16-17; or~~
the whole test structure as shown in Figure 2) for sensing an output signal from said testing means; and

means (test structure as shown in Figure 2) for determining the critical length (column 7, lines 34-48) of a conductor from said output signal.

Referring to claims 15 and 17, Yamamoto discloses determining the critical length of a conductor use Blech's Law (column 7, line 65).

Referring to claims 2 and 18, Yamamoto discloses a plurality of DUTs (2, 3 and 4), and wherein segments of each DUTs has a unique length.

Referring to claims 3 and 19, Yamamoto discloses detecting electromigration in said DUT using Blech's Law (column 7, lines 34-48; line 65).

Referring to claims 13 and 29, Yamamoto discloses detecting a rising voltage drop (column 7, lines 58-60; Figures 3B and 4B) across the metal strips under test.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4-12 and 20-28 are rejected under 35 U.S.C. 103(a) as being
~~unpatentable over Yamamoto (U.S. Patent No. 5,900,735).~~

Referring to claims 4 and 20, Yamamoto discloses the apparatus of claim 2. Yamamoto does not disclose a decoder and a selection circuitry for each DUT. A person of ordinary skill in the art would find it obvious to modify Yamamoto to include a

decoder and a selection circuitry for controlling which DUTs' critical length is to be determined, as a matter of obvious design choice, since it has been held to be within the general skill of a worker in the art to select a known tool for a known purpose on the basis of its suitability for the intended use as a matter of obvious design choice *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA).

Referring to claims 5-6 and 21-22, Yamamoto discloses that the testing means (1) is embodied within an integrated circuit, mounted on a hot chuck.

Referring to claims 7 and 23, Yamamoto discloses the apparatus of claim 3 and 18 wherein the metal strips can have any size and length (column 7, lines 3-4). Yamamoto does not specifically disclose that the metal strips have a length ranging from 10um to 320um. It would have been obvious to a person of ordinary skill in the art, at the time of the invention, to modify the metal strips of Yamamoto's to have a length ranging from 10um to 320um, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Referring to claims 8 and 24, Yamamoto discloses that the metal strips are coupled together with segments of a connecting metal (3 and 4).

~~Referring to claims 9 and 25, Yamamoto discloses that the metal strips are~~
coupled together with segments of a connecting metal (3) wherein the connecting metal (3) is wider than the corresponding metal strips (2). Yamamoto does not specifically disclose that the connecting metals are three times wider than the corresponding metal

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strips. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Yamamoto to have the connecting metals three times wider than the corresponding metal strips, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum value of a variable involves only routine skill in the art. *In re Boesch*, 617 F. 2d 272, 205 USPQ 215, (CCPA 1980).

Referring to claims 10-12 and 26-28, Yamamoto discloses that the metal strips and the connecting metal are coupled with vias (5) formed of an electromigration resistant metal, such as tungsten (column 7, lines 14-16).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bui (U. S. Patent No. 6, 320, 391)--Interconnection device for low and high current stress electromigration and correlation study.

Bothra et al. (U. S. Patent No. 6, 191, 481)--Electromigration impeding composite metallization lines and methods for making the same.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amy He whose telephone number is (703) 305-3360.


The examiner can normally be reached on 8:30am-5pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, N. Le can be reached on (703) 308-0750.

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The official Fax numbers for the organization are (703-872-9318) Before-Final and (703-872-9319) After-Final Office actions. Any inquiry of a general nature relating to this application should be directed to the receptionist at (703) 305-4900.


AH
August 7, 2003


N. Le
Supervisory Patent Examiner
Technology Center 2800